



A BATOI® White Paper

Cloud Computing with BATOI®

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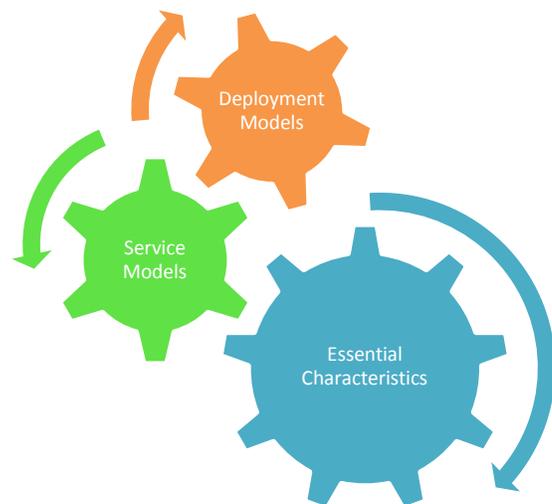
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INTRODUCTION

We talk of computation as a service bundle when we talk of cloud computing. We aim to use the entire platform, including server infrastructure, computer network, operating system and software applications, as a service, and aim to pay per-use basis. The situation is like taking flight to a destination with a small fee where we do not need to be worried about cost and maintenance of aircraft, airport infrastructure, crew salary, etc. We only pay a fee for the flight tickets, for the service we hire, thus pay for use only.

The whole concept of 'Cloud Computing' started with using Software as a Service (**SaaS**) where application service providers setup their software applications to be used on pay-per-use basis. Later, the same concept was extended to infrastructure, and we called it as **IaaS** (Infrastructure as a Service). A natural extension is Platform as a Service (**PaaS**), which included hardware, software and network to give a holistic approach to computing. This inclusive approach to computing, with network and server resources, operating system and software applications, from one or more vendors and located at one or more locations, working in unison to provide storage, application computing and manageability, has led to the model called 'Cloud Computing'.

As per the [definition by National Institute of Standards and Technology \(NIST\)](#), 'Cloud Computing' is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics (on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service), three service models (cloud software as a service or SaaS, cloud platform as a service or PaaS, and cloud infrastructure as a service or IaaS), and four deployment models (private cloud, community



cloud, public cloud, and hybrid cloud) as vividly elaborated on the NIST document <http://www.nist.gov/itl/cloud/upload/cloud-def-v15.pdf>

There is a distinct advantage of cloud computing apart from the cost component. We can scale our resources as per our changing requirements from time to time. This provides an instant availability of practically infinite amount of cost-effective and production-quality computing infrastructure at our disposal. As the resource provisioning and monitoring are done centrally, and resources are maintained redundantly in geographically-distributed locations, cloud model is capable of offering highly available IT resources to consumers. Moreover, perceived security threats are actually at a much lesser scale when we take into account the data stored and software used across different user devices in varied business cycles with traditional IT processes.

On the other hand, the industry with growing number of cloud providers does face many issues in different fronts including usability, interoperability and technology dependence, etc. It is a significantly divided technology landscape with different devices with least usable life-cycle, and with monolithic technology development promoted by big vendors such as Google, Apple and Microsoft. These give rise to an immediate need for a simple yet interoperable technology architecture that is user-centric rather than vendor-centric.

BATOI® makes effort to fill in these exact needs. BATOI® offers a high-level cloud platform (called **BATOI® Cloud**) where user behaviour, rather than programming skills, drives its usage. You can use different pre-built software applications, and can also create and use custom-built applications in a matter of minutes. The software applications on BATOI® Cloud are popularly known as **BATOI® Apps**. As apparent, Apps are served on a SaaS model whereas Cloud Platform is suitably served on a PaaS model.

In this white paper, we shall review the difficulties and issues faced by the consultants and consumers of IT, be it enterprises or individuals, and at different levels of cloud adoption. We shall then discuss the advantages of BATOI® and the steps for successful adoption of this innovative cloud computing platform equipped with varied software applications or BATOI® Apps.

PROBLEM STATEMENT

A plum of happiness spreads over the face of an IT consultant when an inquisitive customer enquires about ‘Cloud Computing’. A sense of faith is bestowed upon the consultant by customer to get the right solution, and perhaps, the today’s solution. At the same breath, the consultant embarks upon the difficult task of providing IT solution with right platforms and apps drawing from the mushrooming industry with a large number of cloud-based IT providers, some claiming ‘go cloud’ to anything they offer while others having complicated proprietary solutions. Both are bad for customer, and consequently dent the credibility of consultant.

On the other hand, the hype of cloud computing has the capability to drive the decision-making at board meetings. A single-person enterprise finds it lucrative to settle with a few cloud providers to meet their different business needs to avoid upfront investment in IT. Even common people hook onto cloud for news, entertainment, education and research.

As far as the statistics goes, it shows an increasing dependence of individuals, enterprises, educational institutions, government and social groups on cloud computing in the coming years. We must note that cloud computing has moved far ahead of the peak of the *Gartner’s Hype Cycle* [Figure: 2]; and moreover, there has been a consistent increase in the adoption of cloud computing at different levels, be in SaaS, IaaS or PaaS [Figure: 3].

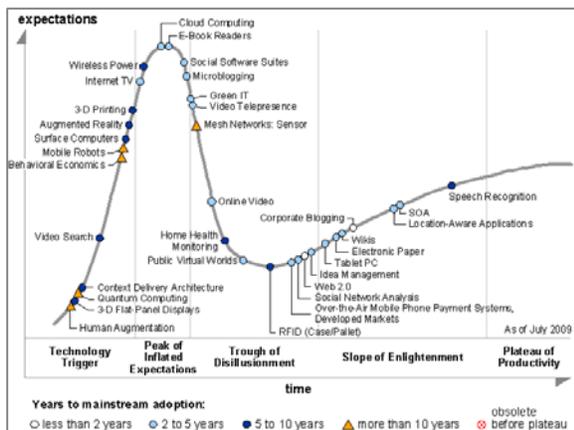


Figure 2: Gartner’s Hype Cycle and Cloud computing
(Source: <http://www.gartner.com/it/page.jsp?id=1124212>)

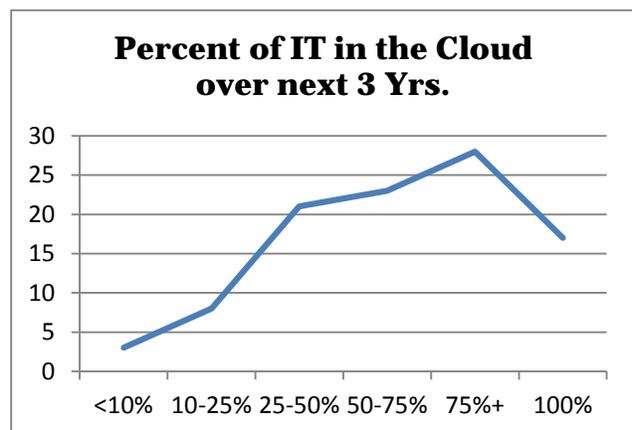


Figure 3: Cloud computing Adoption Rate (Source: March 2011 Issue of Computer, IEEE Computer Society)

At the same time, complexity creeps into making decisions about specific vendors and usage patterns around different cloud systems due to varied yet less-compatible technology standards offered by respective vendors. Also, a growing set of consumers get locked with cloud platforms after they choose to use those. Similar is the case for solution providers who develop their solutions around a particular cloud ecosystem. Though the ecosystem around each offering seems to be expanding, the fear of being locked to particular vendors and lack of simplicity during various usage scenarios looms large on the consumer's side.



When we scan different enterprises, a clear division of interest groups for cloud adoption is seen among those who are already using legacy IT systems and others who are new. For existing IT users, the major task in the process of migration remains to transfer the data to or use the data on the new ecosystem. This task can only be made redundant if the new system can facilitate interoperability and loose-coupling with different vendor platforms.

On the other hand, individual users face added difficulties in accessing their personal data, public social profiles along with enterprise data that they are associated with, at the same time and from the same login without compromising privacy or concerns on both sides.

While using cloud ecosystems across the spectrum of providers, one can clearly see the blatant promotion of proprietary technologies, programming languages, databases and methods of access and usage. Moreover, some providers have integrated social media tightly along with the user profiles that give rise to genuine perception of insecurity.

Let us review these problems or issues at a granular level in the next section.

PREVIOUS SOLUTIONS

In the last several years many solutions have appeared in the market including Salesforce, Google Apps, Zoho, Microsoft Office 365, etc., which have provided general impetus to adoption of cloud computing and its usage. Moreover, hundreds of IT enterprises have come up with tools, vertical solutions and data migration solutions between cloud providers. However, there is a lack of high-level computing platform where people can create and deploy their application without much technical knowledge, where they



can leverage the strength of different cloud infrastructures and platforms, and where they can integrate their existing IT systems with least effort and cost.

INTERLOCKING BETWEEN DEVICES AND PLATFORM

During last several months, different categories of mobile devices have appeared including that of tablets, smartphones and notebook variants. There is a stiff competition between OS vendors like Microsoft, Google and Apple to promote dependence around their own ecosystems with tightly integrated software applications for their own operating systems. They believe of retaining and expanding their user base through such offerings. For example, Microsoft promotes its own Windows OS with a set of software applications that are mutually exclusive in terms of portability and adaptability across other ecosystems like that of Google or Apple. Similar is the case with Google's Android OS and Apple's iOS. Such monolithic techno-economic architectures expose the inability of users to exploit all available options with regard to using appropriate applications for their needs, and to bringing in productivity in their changing digital life from home to office during a day; thus limit the true power of cloud computing.

Individuals and enterprises would prefer to use a platform for seamless productivity if it

1. provides an open ecosystem, yet moderated for quality and security, but devoid of dependence to any specific operating system;
2. provides an standardized API architecture with regulated App-specific security access controls; and
3. facilitates access to different tools and platforms without difficult technical work-around.

VALUE-ADDED TOOLS

Value-added tools are basically software applications that enable users to leverage better usage of the respective platforms. These provide an additional layer of software for using the underlying infrastructure. These do not provide an integrated solution nor extend the capability of underlying platform for end-user to meet their needs. Of course, they provide programmers access to exploit the cloud infrastructure better and in an easier way, but nothing for end-users of IT. Many a times, they are rather considered to provide value-added services within the respective ecosystems, which would be acquired by the parent providers consequently.

Individuals and enterprises would prefer to use a platform for seamless productivity if the applications

1. provide end-to-end solutions to end-users of IT across at least one full business-cycle or usage-cycle;
2. extend the offerings of particular infrastructure to meet goals for end-users, be it business users or common individuals; and
3. facilitate integration with other tools to promote an open ecosystem, yet moderated for quality and security.

VERTICAL SOLUTION PROVIDERS

If we are tracking news in information technology domains, we can very well notice releases of solutions catering to different verticals every other day. Product companies create software applications on specific platforms catering to one or more specific usages that sit on the respective platforms. They fail to address the inherent issues of the parent platform; and also, limit themselves beyond their specific usage. Every such provider caters to one specific activity

or to a limited range of activities. Thus the users are forced to choose multiple providers while dealing with their different needs.

Individuals and enterprises would prefer to use a platform for seamless productivity if the applications, meant for specific verticals,

1. do not limit usability of data to the application itself;
2. provide quick customizability specific to user's requirements without need for programming (even with API) for every small thing; and
3. facilitate controlled access across applications based on enterprise's demand.

NO SINGLE WINDOW FOR MULTITUDE USAGES

There is a serious concerns displayed by users when they use their private data while carrying out their publishing activities on public social media. Similarly, enterprises are scared of allowing personal data management and enterprise functions to be dealt from the same login. These concerns are in fact genuine. Existing solution like *Single-Sign-On (SSO)* just cannot solve problems in every usage scenario as it does not segregate access as long as the same user is accessing two applications, one for personal data management and the other for enterprise functions. Here, enterprise does not have control over this subtle aspect. Similarly, an individual gets tickling when his utterly private data is stored in a public social media; and thus the perception of insecurity prevails.

In short, individuals and enterprises would prefer to use a single platform for seamless productivity if

1. individuals are able to store their private data separated from their public media activities;
2. individuals are able to store their private data separated from their enterprise access; and
3. enterprises have full control with respect to their data and applications – they should be able to restrict the access to applications in all standard ways like location, user, role, data record, and time period etc.

These concerns and setbacks are addressed correctly with BATOI® Ecosystem: BATOI® Cloud and BATOI® Apps.

BATOI SOLUTIONS

As we have already indicated in our introduction of this white paper, BATOI® offers end-to-end solutions to meet the demands of a full business-cycle or usage-cycle. BATOI® Cloud offers a high-level platform where creating customizable applications (or Apps) through WYSIWYG User Interface (UI) and integrating specialized external applications (Apps) through use of standard API, become quite easy and fast. BATOI® Cloud treats every other thing as an App, and thus using native or 3rd party servers, clouds, applications, or even objects become easy and seamless.



BATOI® Cloud offers a single window to users for managing their varied IT usage-cycles. As the Cloud Platform ensures data independence and portability by binding them as objects, users can store their private data without interference of their public media activities or from the enterprise applications they use.

BATOI®'s pre-built applications are of the following types among others:

- **Publishing:** Apps to publish websites, status updates on different social media, online promotional materials, writing e-books and blog; and also apps to consume news, articles, books and reports from different publishers in custom formats;
- **ERP/CRM:** Apps to manage end-to-end business solutions for enterprises;
- **Developer:** Apps to create standard Apps using WYSIWYG UI, and specialized Apps using popular programming languages, and also deploying specialized Apps on different target platforms; and
- **Open Source:** Apps to deploy and maintain popular open source scripts.

REDUCE TIME GAP BETWEEN CONCEPT AND ITS MATERIALIZATION

With growing dependence of business, education and even individuals for their personal needs on IT, there is a great requirement for IT enabled services to reduce time gap between a concept and its materialization. Whereas traditional IT services simply fail to catch the imagination of end-users, the level at which existing cloud vendors deliver is not adequate to fulfill their needs.

In contrast, BATOI® provides a cloud computing platform that takes care of immediate delivery of standard IT services to end-users, and at the same time, offers a great flexibility in quick customization by end-users themselves for their own unique circumstances. Moreover, BATOI® Apps can be accessed from anywhere and from any device, be it desktop, mobile or tablet.

REDUCE COST AND IMPROVE AGILITY

If we review the traditional IT scenario, hardware, software and network infrastructure get obsolete in a year and a half if no upgrade is performed. Thus it becomes quite prohibitive for small and medium scale enterprises (SMEs) due to huge overall cost of development, deployment and maintenance. On the other hand, end-users pay an exorbitant cost at cloud due to ever increasing number of parameters that act as cost-centers.

In contrast, BATOI® offers a comprehensive high-level IT infrastructure services on subscription basis. With BATOI®, end-users do not invest in high-cost hardware, software or network. Also, they do not need to worry about large number of cost parameters. Instead, they get a high-level cloud computing environment where they can use standard Apps (or applications), can create and use their own custom Apps with low monthly subscription fees based on limited parameters like storage, bandwidth and transactions.

INTEROPERABILITY AND STANDARD API

End-user always gets entangled with discrete IT systems to find themselves at odds while achieving their business or professional goals. Even after the spread of cloud computing, the proprietary cloud platforms and unavailability of requisite flexibility to quickly integrate external IT systems, has hindered the process of achieving a comprehensive ecosystem for smooth usage.

In contrast, BATOI® provides a standardized API suite, **BATOI® API**, compatible across other leading cloud ecosystems available today. This enables the end-users of BATOI® Cloud to develop their own private IT ecosystem by integrating their existing IT systems, thereby reducing the cost of transition while retaining the business advantage.

RELIABLE, ROBUST AND SECURE INFRASTRUCTURE

With traditional IT demanding significant manual effort to maintain its standard operational effectiveness, people tend to move their IT processes to cloud. On the other hand, the factors like reliability and robustness of IT services on cloud and the security of data therein create confusion for end-users.

In contrast, BATOI® uses highly effective robust hardware and network infrastructure equipped with high-quality disaster management solutions, yet masking the usual multitude cost parameters that are associated with the scale of deployment required for such purposes. Elaborate security measures have been taken at BATOI® Cloud with the help of proven evolutionary mechanisms. An **enhanced RBAC (Role Based Access Control) scheme** has been used for implementing user access control at Cloud and App levels by end-users. All sensitive data of system are duly encrypted and SSL is in use for preventing fraud with data in transit. Moreover, routine manual and automatic audits are provisioned to reinforce security.

PASSIONATE SUPPORT – ALWAYS AVAILABLE

Support is an integral part of services offered on BATOI® Cloud. The support includes online support ticket, telephone support, and premium support like web based and onsite training and support. For further details, please check the help page at <https://www.batoi.com/help>.

BENEFITS

As we discussed BATOI® solutions in the previous section, it became quite apparent about distinct benefits that the new innovative platform can offer. In this section, we shall discuss details of how BATOI® Cloud would be beneficial to different user groups, both enterprises and common individuals.



BATOI® FOR BUSINESS

Large enterprises and SMEs can exploit the power of BATOI® solutions through the business-specific Apps, collaboration functionalities, and customizability of Apps to specific requirements of their business. Large enterprises can extend their IT system for achieving project-specific collaboration activities. SMEs can

fully depend on BATOI platform for their end-to-end needs.

BATOI® FOR GOVERNMENT & SOCIAL ORGANIZATIONS

Government and social sectors benefit from the cost advantages and open architecture of the BATOI® Cloud platform. The least turn-around time, no upfront cost and facility for creating customizable software applications would give a distinct advantage to these organizations.

BATOI® FOR EDUCATION

There is a great deal of effort to promote higher education and research in developing countries and to encourage youth and middle-aged population in western countries to continue their education. This has implications like reducing cost of academic activities, and improving the IT process that can comply with the changing restrictive measures on expenses. BATOI® Cloud and BATOI® Apps provide end-to-end solutions to manage work process of educational and research institutions, and to improve collaboration on education and research projects.

BATOI® FOR INDIVIDUALS

BATOI® provides single window solution to individuals to manage their activities at home and work while fully respecting the privacy of enterprise data and without compromising their own private data. An individual can store his/her private documents, photos and videos securely in cloud and can participate in different public social media activities without interfering with private data. Similarly, individual can access the assigned applications of the enterprise he/she is associated with from the same platform without affecting privacy on either side.

FOR IT SOLUTION PROVIDERS

IT Solution Providers can use BATOI® Cloud and BATOI® Apps to formulate solutions to their customers without worrying about the need to maintain development or deployment environment. They do not need to deal with long traditional IT process; thereby reducing the maintenance overhead at their end, and thus increasing productivity and profit.

An IT Solution Provider can also undergo a certification process to have a comprehensive understanding of the Cloud Platform, and of managing different Apps. The names and contact details of **BATOI® Certified Partners** are listed in BATOI®'s **Partners' Directory** online. This exposes the certified partners to an increasing number of people and organizations using BATOI® Cloud and BATOI® Apps.

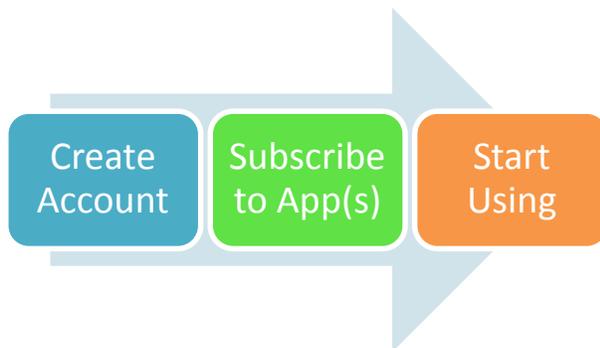
BATOI® FOR DEVELOPERS

Developers have a great opportunity with BATOI® Cloud platform where they can develop useful solutions catering to the need of specific user groups or to specific verticals. They can submit their Apps to **BATOI® AppDirect**, which can then be showcased to all users on BATOI® Cloud platform, exposing a new line of revenue for developers. They can also extend the capability of the existing Apps, and can integrate external legacy systems through the BATOI® API.

IMPLEMENTATION

Implementing in BATOI® cloud is rather easy and fast. Let us discuss the important steps below:

SIMPLE SUBSCRIPTION PROCEDURE AND INSTANT USE

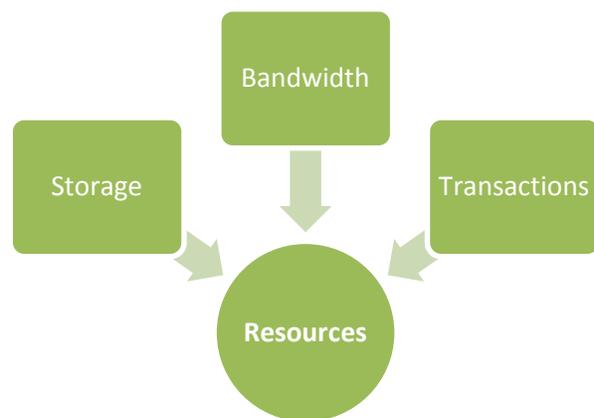


To start using BATOI® is simple, easy and fast. You can get going in a few minutes. The steps involved include creating an account with your name, email ID, and mobile number. After confirming your account through an email verification process, you can login to your account, and can then subscribe to your desired App(s) to start using the system. In fact, there will be a few default free Apps like

Hive (to create, upload, edit and store your documents and other files), and **Calendar** etc., which you can use even without further effort of subscription.

SELF-PROVISIONING AND MONITORING

BATOI® Cloud provides tools for provisioning **resources** required for your needs yourself. Resources on BATOI® Cloud consist of **storage**, **bandwidth** (outgoing), and number of **transactions** you perform while using apps. You are billed for using resources except for managing your account. You can also monitor your resource usage by tracking the reports, and can set the limit of resource usage (separately for storage, bandwidth and transactions) so that you are

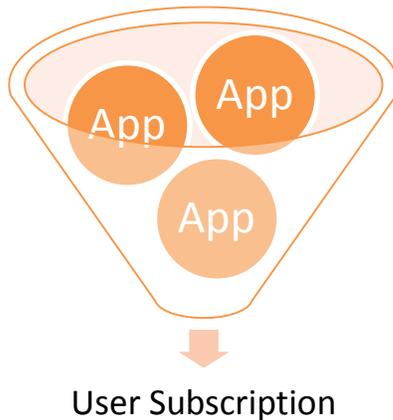


not billed beyond your budget. Storage and bandwidth come in the block of 1MB each, and transactions in number. The resources, as set with limit in each category (i.e., storage,

bandwidth or transactions), must be paid with a credit card or through other allowed methods of transactions available to the user.

USING PRE-BUILT APPS

Users can subscribe to full-fledged apps with a small monthly fee or with no fee as the case may be. The pre-built apps are available in the Apps Store for subscription by valid users. BATOI®

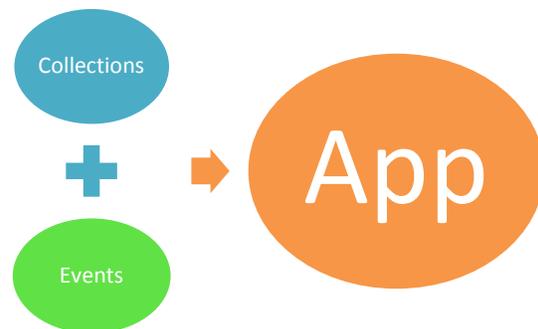


AppDirect is an open platform, yet moderated for quality and security, where increasing number of Apps with different specific solutions are showcased. As data are independent of Apps, there is no difficulty in accessing data from any App within another App on BATOI® Cloud platform. In fact, user can use interoperable data to build useful reports and can get benefits of using interconnected Apps as far as their business process goes. Moreover, BATOI® API can be employed to integrate and port data to and from BATOI® platform. Another important feature of a pre-built

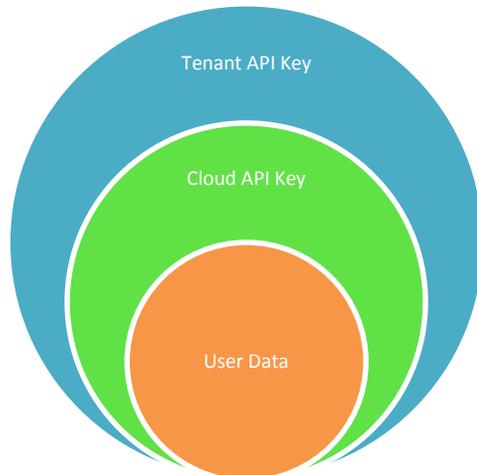
App in its customizability with respect to input fields, etc. This enables users to meet usage-scenario specific requirements.

USING CUSTOM-BUILT APPS

Users can create custom Apps with BATOI® Studio App, which provides tools to build Apps using WYSIWYG UI. The process of creating an App is fast and simple with minimal learning curve. The users can build **data objects** with different data formats, and can use them in a **collection** (set of data objects) with multitude of **events**. These events are then mapped to App's menus to achieve the desired functions as demanded by its users. It is possible to invite users into an App and to assign requisite **User Roles** of the App to the invited user. Role can be set at granular levels up to the **fields** of a data object.



INTEGRATING WITH EXTERNAL SYSTEMS

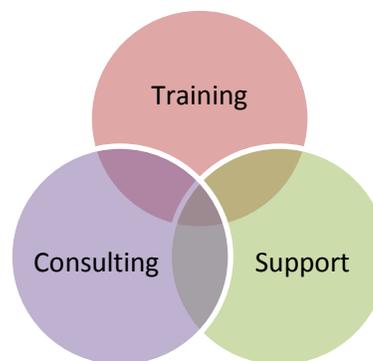


BATOI® API is based on *ReST (Representational State Transfer)* with which users can access their data and App functions from outside the BATOI® platform. However, this open architecture is secured with strict access control through **Tenant API Key** and **Cloud App Key** to materialize every data transaction. Moreover, additional security restrictions can be enforced into the process based on user location, access

period, number of transactions, etc. as appropriate in the particular usage scenario.

TRAINING, SUPPORT AND CONSULTING

BATOI® provides web based training, and also training workshops in different places and during different time. BATOI® also organizes training for a particular organization if the number of users exceeds a critical one. BATOI®'s online support ticket and phone support are bundled with the user account. However, users can avail premium support if the monthly subscribe fee exceeds a critical amount. Moreover, BATOI provides strategic IT consulting with a team of senior consultants from industry, which is popularly known as **BATOI® Better Business (BBB)**.



SUMMARY

As we reviewed the landscape of cloud computing vis-à-vis BATOI® Cloud and BATOI® Apps, we saw a distinct advantage with BATOI®'s offerings in terms of usability of IT systems and interoperability of data.

For IT managers and solution providers, BATOI® facilitates fast creation of software applications and their one-click deployment on cloud. No need to maintain development or deployment environment. Provide solutions to end-users without worrying about handling long traditional IT process.

BATOI® makes IT truly ubiquitous. You may now focus on productivity rather than worrying about IT process. Work from anywhere; run your business from anywhere and with any device. Be more productive and reduce the cost of your IT process with BATOI®. For more information on BATOI® and its offerings, visit its website <https://www.batoi.com>.

**If you do not have an account with
BATOI®, create now at
<https://www.batoi.com/start>**

ABOUT BATOI SYSTEMS (P) LIMITED

BATOI SYSTEMS PRIVATE LIMITED showcases an enterprise-class cloud computing platform, with BATOI® Cloud stacks. The BATOI® Cloud is capable of serving customizable software applications called BATOI® Apps at a large-scale across the globe. You can subscribe pre-built Apps, and can create your own custom Apps in minutes! You can also integrate your legacy software applications through BATOI® API.

BATOI SYSTEMS PRIVATE LIMITED is a registered company in India (registration number: U72900OR2010PTC012712). BATOI is privately funded.

Web: <https://www.batoi.com>

ABOUT ASHWINI RATH

A techno-entrepreneur innovator and writer, Ashwini is the Founder Director & CEO at BATOI Systems (P) Limited. His current interests include semantic web, cloud computing and self-healing information architecture. Ashwini is a strong believer of knowledge-based socio-economic development. He lives with parents, wife and son; and loves Nature and Indian rural life.

Web: <http://www.ashwinirath.com>

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